thecatalyst

WINTER/SPRING 2009 DEPAUL UNIVERSITY DEPARTMENT OF CHEMISTRY

VOLUME 4 ISSUE 1

FROM THE DESK OF

THE CHAIR

Welcome to a newly designed version of *The Catalyst*, our newsletter to alumni and friends of the department. We thought that an upgrade in our publication would dovetail nicely with our move into our spectacular new facility. With this change, we will now be printing twice a year, bringing you news about the goings on within the department. In addition to current information, and acting upon suggestions from some of you who have contacted us over the past couple of years, I plan to start a series of interviews with retired faculty members to let everyone know what they might be up to these days. As usual, we would be more than happy to print news items about our alumni. You can always send us information at our general e-mail address chemistry@che.depaul.edu.

The big day the entire department was waiting for came on December 1, 2008, when we moved into the Andrew J. McGowan Environmental Science and Chemistry Building which also goes by the name McGowan-South to distinguish it from its neighbor to the north. We made it through the winter quarter with some hiccoughs as you might expect, but in general everything went well. Please look inside this issue for a story about the newest building on DePaul's Lincoln Park campus. This building would not be here if not for the generosity of many people, including chemistry alumni. On behalf of the department, I want to thank all who contributed to the Excellence in Science building campaign as well as those who continue to support us through generous donations each year.

Those of you who live around Chicago know that while the calendar indicates we are in spring right now, the weather is not cooperating! Hopefully warmer days lie ahead for us all. If you find yourself travelling through Lincoln Park, please stop by and see McGowan-South for yourself. You can always contact the main office in advance and we will happily make arrangements for a personal tour. As usual, you can keep up to date by visiting our web site at http://chemistry.depaul.edu.

Best regards,

Richard F. Niedziela
Associate Professor and Chair
Class of 1988

what's inside?

DEPAUL UNIVERSITY
COLLEGE OF LIBERAL ARTS AND SCIENCES

We've Moved

Perhaps the most exciting news in many years for the Department of Chemistry is our move into a new facility. The entire department is now located in the four-story, 129,000 square foot **Monsignor Andrew J. McGowan Environmental Science and Chemistry building**, or **McGowan South**. The members of the various science departments at DePaul got their first look at the new building on September 28, 2008 when we were given a tour of the building in progress. We were shown the classrooms on the first floor, of which there are six, ranging in size from 35 seats to 150 seats. The department's main office, as well as a few chemistry faculty offices and the main chemistry stock room are also located on the first floor. The second floor of the building houses the Environmental Science Program and a portion of the Department of Biology. A large breezeway connects McGowan South to the current biology building, McGowan North. All of the teaching and research laboratories for chemistry are located on the third floor of the building. The fourth floor is intended as expansion space. The view of the Chicago skyline from the top of the building is truly phenomenal. Students can also see the Sears Tower from the windows in one of the general chemistry teaching labs.

After the tour, we were treated to a reception at which several of those involved in obtaining support for the new building spoke about the meaning of this new building to them. A particular anecdote that stood out was related by Tom Murphy (Emeritus Professor of both Chemistry and Environmental Science), who shared the fact that he had been shown the blue prints for a new chemistry building when he was hired in 1968 – forty years later, this vision has become a reality. Following the reception, Nobel laureate, Dr. Leon M. Lederman (Physics, 1988), one of the nation's leading scientists and a lifelong advocate for improving science education, addressed the DePaul community in a lecture on the importance of making science more widely accessible in the U.S. Lederman's primary message, in this important election year was that we all, politicians included, need to have a grasp of science. Lederman emphasized the importance of educating students to be scientifically literate and for graduates to understand that there is a vast amount of knowledge "still left uncovered."

Many students helped the department move into the new building beginning on December 1. It was wonderful to witness the excitement of the students and faculty as they moved into their new home. Some of our student workers are pictured on page three in front of the collage of photographs of DePaul science students and faculty in the form of St. Vincent DePaul that can be seen in the lobby of the new building. This mural, designed by a DePaul art student, celebrates the science faculty and students from the past, and welcomes the many more that will grace the halls of the Monsignor Andrew J. McGowan Environmental Science and Chemistry building in the upcoming years. The Department of Chemistry is grateful to all those that contributed to this building and we welcome our alumni to stop by and see us at our new location.

Pictured above is the McGowan South Atrium open for students to sit and for the university to hold events.

Left: *The breezeway connecting the two McGowan buildings*

Center: *A view of the east side of McGowan South*

Right: *A few chemistry students who helped with the big move standing in front of the grand picture mosaic of St.Vincent DePaul*

New Faculty Members

The department is thrilled with the recent addition of two outstanding young assistant professors, **Dr. Justin J. Maresh** and **Dr. Melanie J. Schroeder Patterson**. Dr. Maresh is a biochemist and medicinal chemist, replacing the tenure-track position vacated by Dr. Layne Morsch who joined the faculty at the University of Illinois at Springfield. Dr. Schroeder Patterson, an analytical biochemist, is joining us in a one-year visiting position.

On Left: *Dr. Justin Maresh*
On Right: *Dr. Melanie Schroeder Patterson*

Dr. Maresh received his Ph.D. in Chemistry from the University of Chicago working under Dr. David G. Lynn. Prior to DePaul, he was a postdoctoral fellow at MIT in Dr. Sarah O'Connor's lab in Chemistry. Dr. Maresh studies the biochemical steps that living organisms employ to synthesize complex molecules. His ultimate goal is to discover ways to use and even reprogram biosynthetic pathways to produce novel "unnatural" products for pharmaceutical drug screening and low-cost, biologically-based industrial synthesis. Dr. Maresh employs a multi-disciplinary approach to develop new synthetic technologies: natural product isolation, structure elucidation, chemical synthesis, molecular biology, enzymology, protein expression, bioreactor development, and design of pharmaceutical activity assays are key components of his research. Specifically, Dr. Maresh will use simple synthetic molecules supplied to the growth media of plant cell and bacterial cultures to generate novel chemical compounds.

Dr. Schroeder Patterson received her Ph.D. in Chemistry from the University of Virginia under the guidance of Dr. Donald F. Hunt. She was a postdoctoral research associate with Dr. Milan Mrksich at the University of Chicago before coming to DePaul. Dr. Schroeder Patterson's research focuses on identifying proteins involved in cell adhesion, a process that can cause cells to become malignant if not properly regulated. The approach Dr. Schroeder Patterson uses is liquid chromatography coupled to a mass spectrometer to separate and measure mass to charge ratios, respectively. Specific algorithms are then used to correlate the mass spectra to those from known proteins in a database. The lists of proteins thus identified for healthy cells are then compared to those for cancerous cells. Proteins that are either up- or down-regulated in response to malignancy are then identified. Another focus of Dr. Schroeder Patterson's research is the identification of protein post-translational modification by chemical groups, an aspect of protein metabolism that is essential for protein function.

Newly Tenured

Dr. Lihua Jin, who joined the Department in 2002, was granted tenure and promotion to associate professor in June, 2008. Dr. Jin wishes to thank all of the current and former students who took her classes, who contributed to her research and all who supported her case. She looks forward to many more years of service to the students, the Department and the University by continuing to improve as a teacher, researcher and campus citizen.

Department Seminars

The Department of Chemistry hosted two Seminar speakers during the fall quarter of 2008.

Plume Sniffing: measuring air toxics in Houston

Lori A. Del Negro

Lake Forest College, Lake Forest, Illinois

Lori Del Negro is an Assistant Professor at Lake Forest College, Lake Forest, IL. She is an analytical chemist specializing in the measurement of airborne molecules in the troposphere. Professor Del Negro described a recent trip to Houston to measure benzene in the emissions from refineries. She showed the audience some of the new ionization techniques that allowed the team to measure organic molecules in the lower atmosphere. She also showed us how to work backwards from aircraft based measurements to figure out the flux of a particular pollutant coming from a specific location. Dr. Del Negro also showed us some of her plans to measure air-toxics in the Chicago area.

Spectroscopy in the service of dynamics...

Professor Brian Dian

Purdue University, West Lafayette, IN.

Dr. Brian Dian is a 1998 graduate of DePaul. He returned for the first time to see how things have changed. We certainly had a lot to show him. Professor Dian showed us how he is giving new life to microwave rotational spectroscopy. He explained a newly developed technique used in his lab to obtain a high-resolution rotational spectrum of a molecule in a rapid manner. The spectra obtained allow the structures of the molecules present to be determined. Dr. Dian is using this spectroscopic technique in a variety of ways, including the determination of intermediates generated in combustion reactions, analyzing the species present after electronic excitation of a molecule, and quantum computing.

CATALYST PUZZLE

Down

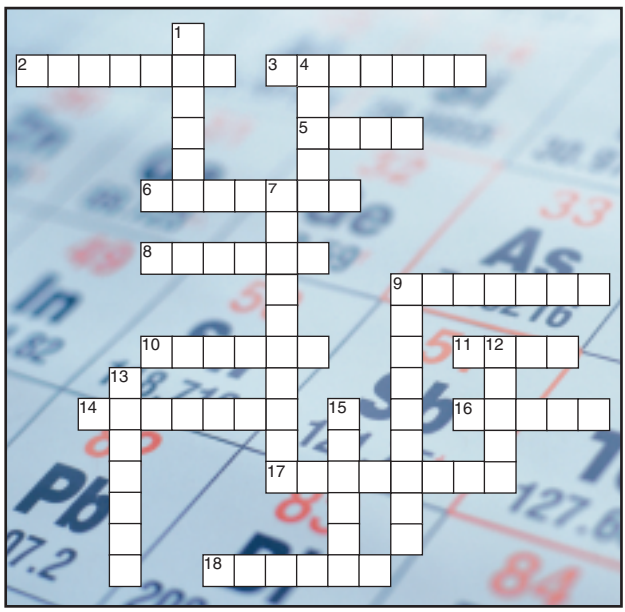
1. Common unit for energy
4. Properties of lipids
7. Reactions which produce heat
9. Basic properties
12. Harmful in the troposphere
13. Liquid at room temperature
15. A bond in which two pairs of electrons are shared

Across

2. Superman's gas
3. A chemist's spoon
5. Found in car batteries
6. Compounds with the same molecular formula
8. Tetrahedral
9. Salts formed by group seven elements
10. Chemists use this like a mug
11. Chemists favorite unit of measure
14. Element found in fuel pellets
16. Type of bonding in salts
17. Container used in gravimetric analysis
18. Necessary for combustion

Want to know the answers?

Go to our website at http://chemistry.depaul.edu to find the answers and other information about the Department of Chemistry.



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Chemistry Students Showcase Their Research

The sixth annual **Natural Sciences, Mathematics & Technology Showcase** was held on Friday, November 7, 2008 in the Student Center Atrium of the Lincoln Park Campus. Nearly eighty students from eight different departments or programs presented posters of their on-going, faculty-directed research. Among the student presenters, were the following seventeen chemistry students, whose research projects and faculty mentors are highlighted below:

Natalie Rizzo: "Steric Modifications to the $P_4(NR)_6$ Ligand and Preparation of Coordination Polymers" (Dr. Sommer)

Ansonia Badgett: "Reactions of ot-ppm with Palladium Sources" (Dr. Shelby)

Eleazar Lumbreras: "Reactions of dppm with Palladium Sources" (Dr. Shelby)

Elizabeth Sisler: "Reactions of dotpm with Palladium Sources" (Dr. Shelby)

Christina Casciato, **Danielle Gaynor**, and **Michael Kelliher**: "Probing Antibody Conformations Using Single Molecule Fluorescence Spectroscopy:" (Dr. Southern)

Emi Hanawa: "Novel Copolymers of 2-Phenyl-1,1-dicyanoethylene with Pentafluorostyrene" (Dr. Kharas)

Benjamin Hill: "Novel Copolymers of 2-phenyl-1,1-dicyanoethylene with 4-fluorostyerene" (Dr. Greg Kharas)

Nik Bajaj and **Barrett Unger**: "Development of a Project-Based Organic Laboratory Experience" (Dr. Dintzner)

Matt Zuziak and **Kevin Schwalbach**: "Progress Toward Clay-catalyzed Rearrangements and Cyclizations" (Dr. Matt Dintzner)

Lorelei DiTommaso: "Hydrogen Bonding Cooperativity" (Dr. Parra)

Benjamin Hill: "Rotational Energy Profile of Fluorinated Bifuran, Bithiophene, and Thienyl furan" (Dr. Parra)

Kim Tran: "Binding Energies of Heterocyclic Compounds: an *ab initio* study" (Dr. Parra)

Irina Doncheva: "Interaction of Amyloid Beta Peptide 1-16 Interaction with Metal Ions" (Dr. Jin)

According to the event organizers, this now annual event began in 2002 "as a way to highlight the research and activities in the natural sciences, mathematics, and computer science areas at the university." The event focuses on research that is conducted primarily by undergraduate students working in conjunction with a faculty advisor. The research presented at this year's event was particularly impressive in its breadth—all areas of chemistry research currently being conducted within the department were represented.